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Udder Health and Mastitis

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Recommended Citation

South Dakota State University, Cooperative Extension, "Udder Health and Mastitis" (1969). *SDSU Extension Fact Sheets*. 1155.

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Udder Health and Mastitis

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AUG 29 1959

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Cooperative Extension Service
South Dakota State University
U. S. Department of Agriculture

Udder Health and Mastitis

FS 460

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Technically mastitis means "inflammation of the udder." It can result from many causes such as mechanical injury or bacterial or other type infection. The most common cause of mastitis is bacterial infection. Some bacteria can invade healthy tissue while others must be aided by some injury to the udder or teat in order to establish infection. The injury may be sudden and severe as when a teat is cut, mashed, or frozen. Or, the injury may be less severe but occur over a long period of time as with improper milking.

For many years, mastitis has been a major health problem in dairy cattle. The annual loss to dairymen in the U.S. due to mastitis has been estimated to be more than \$250 million.

Many types of bacteria are associated with mastitis, but over 95% of the problem is caused by two major types of organisms. *Streptococcus agalactiae* is the most common streptococcal invader of the bovine udder. *Staphylococcus aureus* and other closely related organisms make up to the other most common types of bacteria which cause mastitis.

Since these two organisms cause the largest portion of mastitis, the greatest emphasis will be on the disease as caused by them. Because the source of infection, the contagiousness, and the effects in the udder of these two types of bacteria differ, it is necessary to consider them as two diseases.

MASTITIS CAUSED BY STR. AGALACTIAE (STREP AG)

The means to control, and even eradicate, this organism from herds of dairy cattle have been known for over 15 years. Still, the incidence of mastitis due to this organism has remained about the same. Research has shown that the elimination of strep ag mastitis from a herd can increase the average milk yield per cow as much as 25%.

Strep ag is found almost exclusively in the udder of cows. It does not live more than a few hours outside the udder under usual conditions. Therefore, the source of infection is generally the infected cow. It is easily carried from cow to cow by milker's hands, milking machines, wash cloths, etc. All known strains of it are highly invasive to the bovine udder. As few as six organisms introduced directly into the teat cistern will produce infection very consistently. It spreads at a steady rate through a herd of milk cows under ordinary milking procedures.

Symptoms

Strep ag seldom causes acute signs of illness in the infected cow. The affected quarter will occasionally swell and become inflamed for a few hours, and sub-

sequently may produce some "gargety" milk for one or two milkings. The inflammation usually subsides within 48 hours without treatment, and the quarter appears normal until the next flare-up, which may occur in a matter of days or weeks. Over a period of one or more lactations, the production of the affected quarter gradually decreases and practically ceases.

Because symptoms of this type of mastitis are frequently very mild, the herdsman may be unaware that many of his cows are suffering from low grade mastitis which is reducing their production from 10-25%.

The infection responds well to treatment with antibiotics, but no immunity develops. The same quarter may become reinfected innumerable times. Since the source of the infectious organism is, for practical purposes, confined to infected cows, it is possible and practical to completely eliminate strep ag infection from a dairy herd.

How to Eliminate Strep Ag from Herd

1. **Take a milk sample from each quarter of every cow to test for strep ag infection.** These samples must be carefully drawn into special sterile tubes so no contamination will occur. This should be done by your veterinarian or under his direction. He will then send these samples to a diagnostic laboratory for bacteriologic examination.
2. **Treat infected quarters.** The laboratory tests will identify the quarters that need to be treated. Drug sensitivity tests at the laboratory will show what drugs will be most effective against the infection in your herd. Your veterinarian can advise you.
3. **Repeat the quarter sampling on all lactating cows 2-4 weeks after treatment.** Quarters showing strep ag should be treated. Repeat sampling at 2 to 4 week intervals until you have two successive clean tests on all cows.
4. **Cull any cow with a quarter that remains infected after two treatments.**
5. **Treat every quarter of each cow dry at the time of the first test.** Re-treat each of these quarters at the time the cow freshens and before she enters the milking string.
6. **Keep any newly purchased cow separate from the milking herd until a test shows her free of strep ag infection.**

If these procedures are followed, strep ag mastitis can be eradicated from a herd of dairy cattle in 6 months to 1 year. Once the organism is eradicated from a herd, it will not recur unless it is carried in by an infected cow.

STAPHYLOCOCCAL AND OTHER TYPES OF MASTITIS

The disease caused by *Staph. aureus* and other related staph organisms is not as well understood as that caused by strep ag. Mastitis caused by staph has increased in frequency and importance with the use of antibiotics and with management changes which have taken place since the 1940's.

Staph which may cause mastitis are found in many places. They grow and multiply on the skin of the udder and other areas of the body of the cow and other animals, including humans. Staph are frequently associated with infections of the skin, such as abscesses and pimples. It is therefore obvious that exclusion of this infection from a herd of milk cows is difficult, if not impossible.

Symptoms

Infection of the udder with staph sometimes produces an acute illness. The cow has a fever and refuses to eat. The infected quarter is swollen, red, hot, and painful. The secretion from it is visibly altered and usually very scant. This acute mastitis may develop into a blood poisoning or gangrenous mastitis and the cow may die. Should the cow recover, chronic mastitis invariably results.

At other times, invasion of the udder by staph may produce very few outward signs. No sickness is noted in the cow, but the udder may swell slightly for a short time. The milk from the infected quarter may appear abnormal for a few days, but often there is only a slight change of color or consistency which is easily overlooked. These chronically affected quarters may have acute flare-ups of mastitis, especially at the time the cow freshens. The quarter produces decreasing amounts of milk and becomes firm and fibrous.

Well established staph infections respond poorly to treatment with antibiotics.

The acute form of mastitis is easily recognized by all experienced dairymen, but many chronically affected udders may be present in the herd without the owner being aware of it. For every case of acute mastitis in a herd there may be 10 to 25 quarters with chronic mastitis. These quarters produce 5% to 75% less milk than normal quarters on the same cow. The milk contains an abnormally large number of white

blood cells and greatly reduced amounts of solids-not-fat.

The table illustrates loss of milk production in a quarter as related to the severity of the inflammation. The amount of inflammation is measured by the number of white blood cells in the milk. (Also see Fact Sheet 405, *Screening Tests for Abnormal Milk.*)

The loss due to the decreased milk production caused by mastitis averages close to \$50 per cow per year in South Dakota. This loss in net profit does not take into account the other losses due to cows leaving the herd before they should, or the cost of treatment and the milk discarded during this time. Obviously control of mastitis can be a paying proposition.

Control Methods

To establish a mastitis control program, it is necessary to carry out diagnostic procedures which will identify the infection in the herd. In other words, learn if the problem is caused by strep ag or staph, or both, or if there is some other less common infection in the herd. To determine this, it is necessary to take sterile milk samples from each individual quarter and have them cultured and the white cell content determined.

These procedures also reveal which individual cows are infected so that proper milking order can be arranged to prevent the spread of the infection to non-infected cows. This information will also allow the proper treatment of the infected quarters.

Milking Machine and Equipment

Completely examine the milking equipment and measure its actions while the machine is under maximum load. Make alterations so the machine conforms to the minimum standards for milking machine functions as set forth by the National Mastitis Council in its booklet, "Current Concepts of Mastitis."¹

Examine in detail all management, milking and sanitation procedures and make changes to improve any that are questionable. Any practice which may stress or injure the udder must be eliminated.

Herd Replacements

Purchase of mature cows as herd replacements is a hazardous practice. The best means of acquiring replacements is to raise them. Purchasing heifers which have never freshened is the next best means. Mastitis is easy enough to acquire without buying it. If it is absolutely necessary to buy mature cows, they must be kept entirely separate from the herd for at least a month. During this time have them thoroughly examined for mastitis and other infectious diseases. It is sur-

| CMT reaction* | Number WBC per cc milk† | Production loss in lbs. of milk per day | %SNF‡ |
|---------------|----------------------------|-----------------------------------------|-------|
| Neg | 0 to 200,000 | 0.0 | |
| Trace | 150,000 to 500,000 | 0.5 | |
| +1 | 400,00 to 1,500,00 | 1.0 | -1% |
| +2 | 800,000 to 5,000,000 | 1.7 | -3% |
| +3 | Generally 5,000,000 & over | 2.7 | -7% |

*CMT—California Mastitis Test

†WBC—White Blood Cells

‡SNF—Solids-not-fat

¹Available from the National Mastitis Council, 910 17th St. NW, Washington, D. C. 20006

prising how much trouble a herdsman can avoid by following this rule with any newly purchased livestock.

Preventing mastitis is not a single shot job which you do one day and then forget. It requires everyday attention of the herdsman and milkers, and they will need help and advice from their veterinarian and other specialists. Reducing the incidence of mastitis once

it is well established in a herd is not easy, nor is it done quickly. Treatment, especially of well established staphylococcal mastitis, is frequently disappointing. Vaccination is useless for strep ag, and of limited value in staph mastitis. Frequently the herd has to "grow" out of mastitis. To do this, the infection must be kept out of the young replacement cows. This is the goal of a mastitis program.

HOW TO KEEP MASTITIS UNDER CONTROL

1. Use the CMT type of test routinely to detect mastitis early and determine the general udder health of the herd.
2. Identify the organism causing mastitis by laboratory culture of milk samples.
3. Drug sensitivity tests can show which drugs will be most effective.
4. Check all equipment and management practices related to milking, and make all changes necessary to relieve udder stress and prevent spread of mastitis organisms.
5. Aim mastitis control programs at prevention.
6. Ask your veterinarian for assistance.

You may be interested in these fact sheets for additional information:

FS 403 "Milk Production"

FS 404 "The Milking Machine"

FS 405 "Screening Tests for Abnormal Milk"



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